

Notice of Allowability

Application No.

10/533,557

Applicant(s)

MAZET ET AL.

Examiner

Art Unit

Kevin Mew

2416

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/6/09.
2. ☒ The allowed claim(s) is/are 2-3, 7, 9, which have been renumbered as claims 2-3, 1, 4, respectively.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>3/16/09</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date ____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other ____. |

Detailed Action

Response to Amendment

1. Applicant's Remarks/Arguments filed on 3/6/2009 regarding claims 2-3, 7, 9 have been considered. Claims 1, 4-6, 8, 10 have been canceled by the Applicant. Claims 2-3, 7, 9 are currently pending.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with applicant's representative, Ms. Barbara R. Doutre, on 3/16/2009.

The application has been amended for claims 7 and 9 as follows:

Art Unit: 2416

7. (Currently Amended) A method of channel estimation in a wireless orthogonal frequency division multiplexed (OFDM) communication system, comprising the steps of:

receiving a signal in time domain; applying a Fourier transform to said received signal to obtain a frequency domain signal including a plurality of sub-carriers;

estimating probabilities of coded bits for at least said plurality of frequency domain sub-carriers;

performing channel coefficient estimation by a signal processor of a wireless communication unit for at least said plurality of frequency domain sub-carriers using channel coefficient estimates for at least one other of said plurality of frequency domain sub-carriers;

repeating said steps of estimating probabilities and performing channel coefficient estimation so as to improve iteratively an accuracy of said channel coefficient estimates and wherein the step of performing channel coefficient estimates comprises replacing previously estimated channel coefficients of said plurality of frequency domain sub-carriers with respective current channel coefficient estimates; and

wherein repeating said step of performing channel coefficient estimation comprises applying a cost function on an Expectation-Maximization algorithm on said plurality of frequency domain sub-carriers to improve said channel coefficient estimates.

Art Unit: 2416

9. (Currently Amended) A method of channel estimation in a wireless orthogonal frequency division multiplexed (OFDM) communication system, comprising the steps of:
receiving a signal in time domain;

applying a Fourier transform to said received signal to obtain a frequency domain signal including a plurality of sub-carriers;

estimating probabilities of coded bits for at least said plurality of frequency domain sub-carriers;

performing channel coefficient estimation by a signal processor of a wireless communication unit for at least said plurality of frequency domain sub-carriers using channel coefficient estimates for at least one other of said plurality of frequency domain sub-carriers;

repeating said steps of estimating probabilities and performing channel coefficient estimation so as to improve iteratively an accuracy of said channel coefficient estimates and

wherein said step of performing a channel coefficient estimation comprises applying a forward-backward algorithm on said received signal to said plurality of channel coefficient estimates in which estimates are made in a first order of said plurality of frequency domain sub-carriers and subsequently estimates are made in a reversed order of said plurality of frequency domain sub-carriers so as substantially to ~~equalise~~ equalize an estimation accuracy across said plurality of frequency domain sub-carriers.

EXAMINER'S STATEMENT OF REASONS FOR ALLOWANCE

3. The following is an examiner's statement of reasons for allowance:

The present application relates to providing a method of channel estimation in a wireless orthogonal frequency division multiplexed (OFDM) communication system, including the unique steps of:

“wherein repeating said step of performing channel coefficient estimation comprises applying a cost function on an Expectation-Maximization algorithm on said plurality of frequency domain sub-carriers to improve said channel coefficient estimates.”

The closest prior art, Maximum a Posteriori Multipath Fading Channel Estimation (XP-001133082), discloses a OFDM multipath fading channel estimation system and method comprising a channel estimation algorithm for estimating probabilities for a plurality of frequency domain sub-carriers. However, Maximum a Posteriori Multipath Fading Channel Estimation fails to anticipate or render obvious the above quoted limitations of the present application. This renders the claims allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Mew whose telephone number is 571-272-3141. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Chi H Pham/
Supervisory Patent Examiner, Art Unit
2416

/K. M./
Examiner, Art Unit 2416